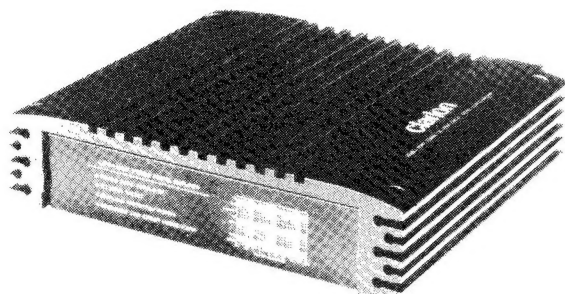


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Service Manual

Published by Service Administration Section



**140W + 140W(PEAK) DC SERVO
STEREO POWER AMPLIFIER**

Model 1002HA (EE-713A)

■ SPECIFICATIONS:

Circuit system : W-servo regulator
PWM±2 power units
Parallel push-pull complementary circuit
Current mirror load circuit
DC servo circuit

Rated power : 80W+80W (1 kHz, 0.1 %, 4Ω)
Max. power : 140W+140W (Peak)
Load impedance : 4Ω × 2
Power supply voltage :
DC 14.4V (10.8 to 15.6V)
Negative ground

Current consumption :
20A (at rated power)

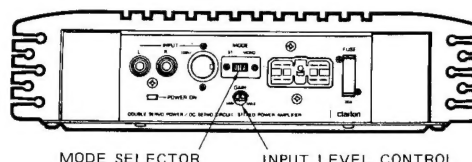
Dimensions : Width 245 mm
Height 62 mm
Depth 250 mm

Weight : 3.8 kg

■ FEATURES:

- Total Maximum Power Output 140W+140W (PEAK)
- EIAJ Max. Output Power 100W+100W (@ 1kHz, 10% THD)
- Continuous Output Power 160W (80W/ch. into 4 Ohm, 20Hz to 20kHz, @ 0.1% THD)
- Bridge (MONO) Capability (Max. 200W @ 10% THD)
- DC Servo Circuit
- Double Servo Regulator Power Supply Circuit
- Isolated Input Ground Circuit
- Adjustable Input Level Control
- 10Hz to 60kHz (−1dB) Frequency Response
- Overvoltage Protection System
- Overheating Protection Circuit
- Speaker Lead Short Protection Circuit
- Turn ON Muting Circuit (Soft Start)
- Automatic Remote Switching Circuit

■ OPERATION:



■ COMPONENTS:

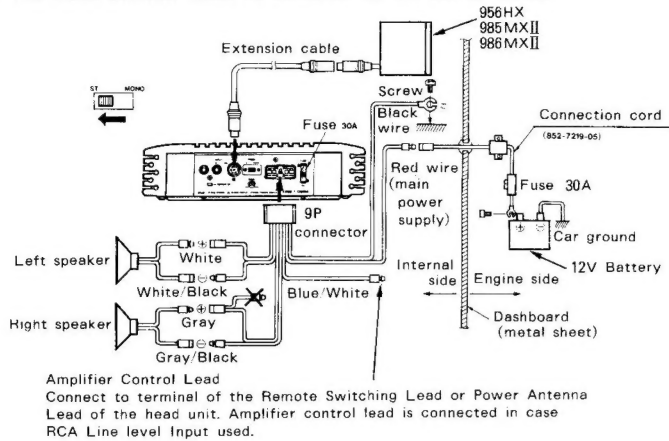
● EE-713A-01		
Main unit		1
Parts bag	653-0086-39	1
Lead holder	335-0833-01	5
Tap-screw	653-0086-48	6
Plate nut	653-0086-49	4
DIN cable	653-0088-04	1
Extension lead (Power supply)	852-7219-05	1
9 P connector	653-0088-03	1

- **MODE SELECTOR** : Set the mode selector to the desired mode.
MODE SELECTOR (MONO) : To use the amp for monaural reproduction only, remove the two screws, turn the plate 180° and fasten the plate using the two screws.
- **INPUT LEVEL CONTROL** : Adjust the input level control to obtain desired gain.

WIRE CONNECTION:

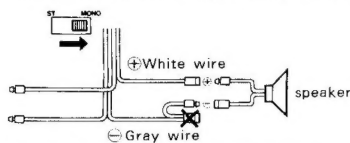
STEREO MODE

- The mode selector must be switched to the stereo mode.



MONO (BRIDGE) MODE

- The mode selector must be switched to the mono (bridge) mode.



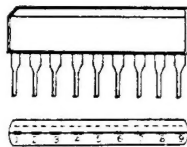
- Note: 1) The head wires marked "X" are not used. Make sure that they are not in contact with metal.
- 2) When not using the DIN cord, Input to the RCA terminal. In this case, connect the amplifier control lead (blue/white) in the 9 pin connector to the external power lead from the unit. When using the RCA terminal in mono, only connect the left channel.
- 3) Use 4 ohms impedance speakers with maximum wattage rating of more than 100 watts (mono mode: 200 watts)

EXPLANATION OF IC's:

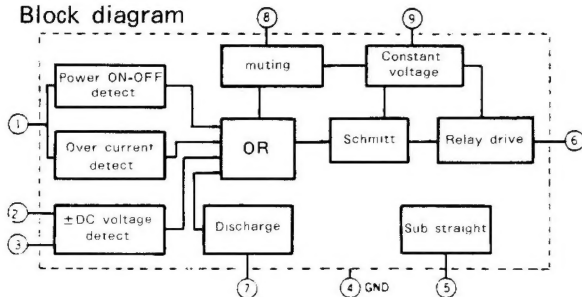
TA 7317P 051-0247-00 OCL

Power Amp. & Speaker protection circuit

Outward Form



Block diagram

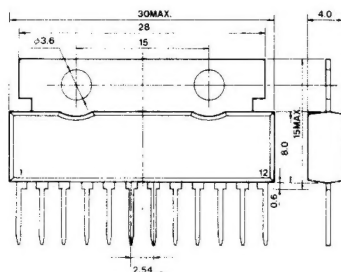


μPC1225H 653-0086-50 30 ~ 50W

Power amp • driver

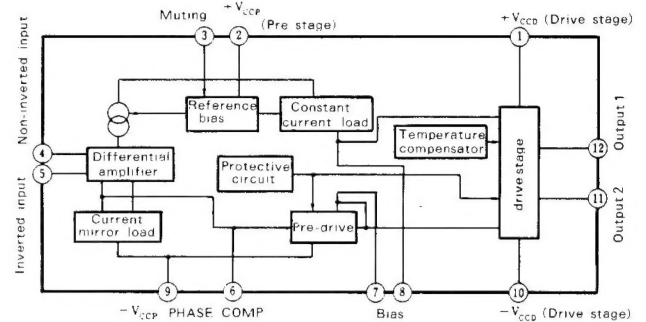
This IC is a stereo Hi-Fi power amplifier driver. It consists of a Voltage amplifier circuit, pre-drive circuit, drive circuit, and protective circuit.

Outward Form



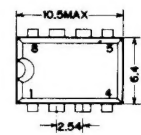
Terminal Description

端子No.	接 続
1	+V _{CCD} (Drive stage power)
2	+V _{CCP} (Pre-drive stage power)
3	MUTING
4	INPUT
5	NFB
6	PHASE COMP
7	BIAS
8	BIAS
9	-V _{CCP} (Pre-drive stage power)
10	-V _{CCD} (Drive stage power)
11	LOWER OUTPUT
12	UPPER OUTPUT

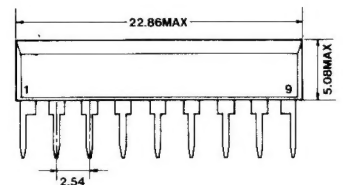


- μPC4570C 659-0247-15 Super low noise,
- μPC4570HA 653-0086-58 High speed, wide-band Dual OP. Amp.

Outward Form



μPC4570C

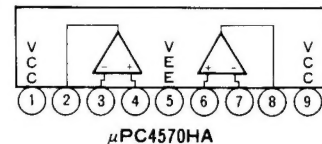


μPC4570HA

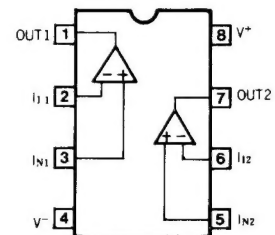
Feature

- Phase compensation
- Noise voltage referred to input ($f=1\text{kHz}$) $4.5\text{nV}/\sqrt{\text{Hz}}$
- T.H.D ($f=20\text{Hz} \sim 20\text{kHz}$) 0.002%
- Slew rate $7\text{V}/\mu\text{s}$

Block Diagram



μPC4570HA



(Top View)

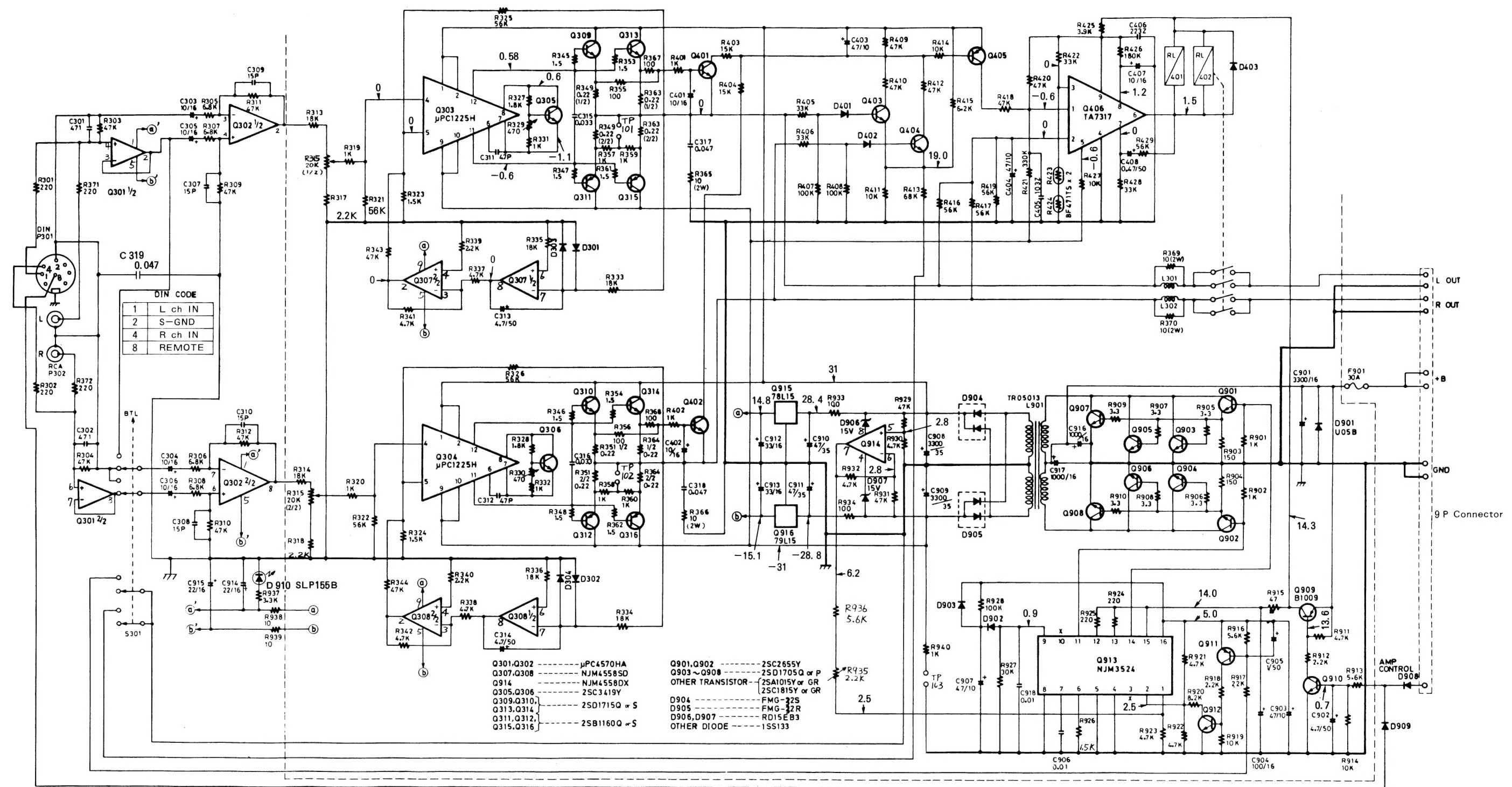
μPC4570C

■ NJM 3524 051-0749-00 PWM

Switching Regulator Controller

Refer to the description in Explanation of ICS Vol. 2.
(Page 50)

■CIRCUIT DIAGRAM:

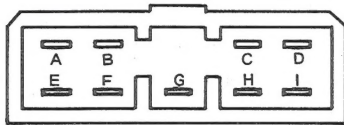


* The voltages are as measured with a digital voltmeter without stereo signals. (DCV)

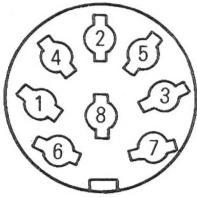
Note: Remember that the heat sink for μ PC1225H is expressed in $-V_{pc}$.

PRINTED WIRING BOARD:

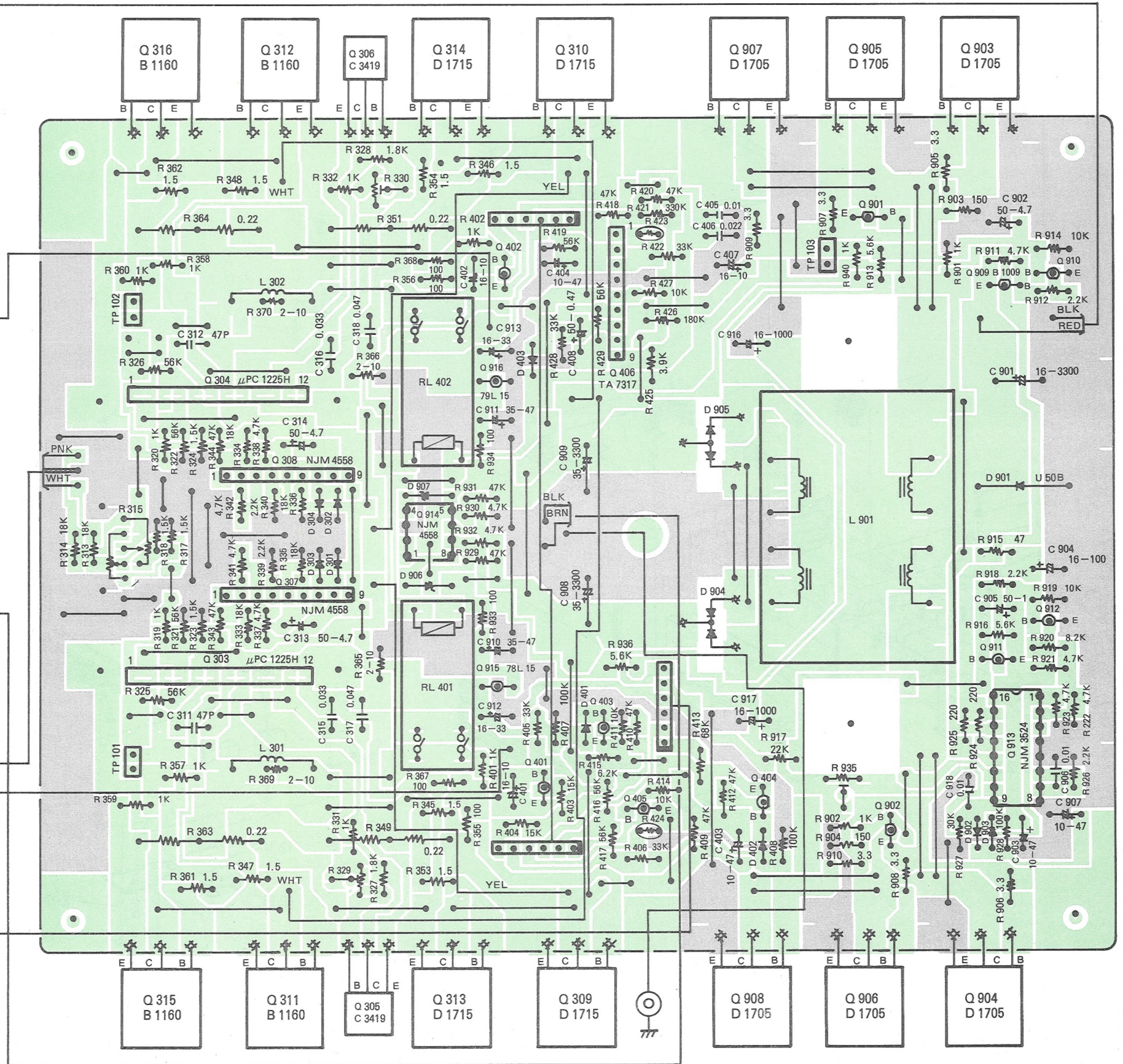
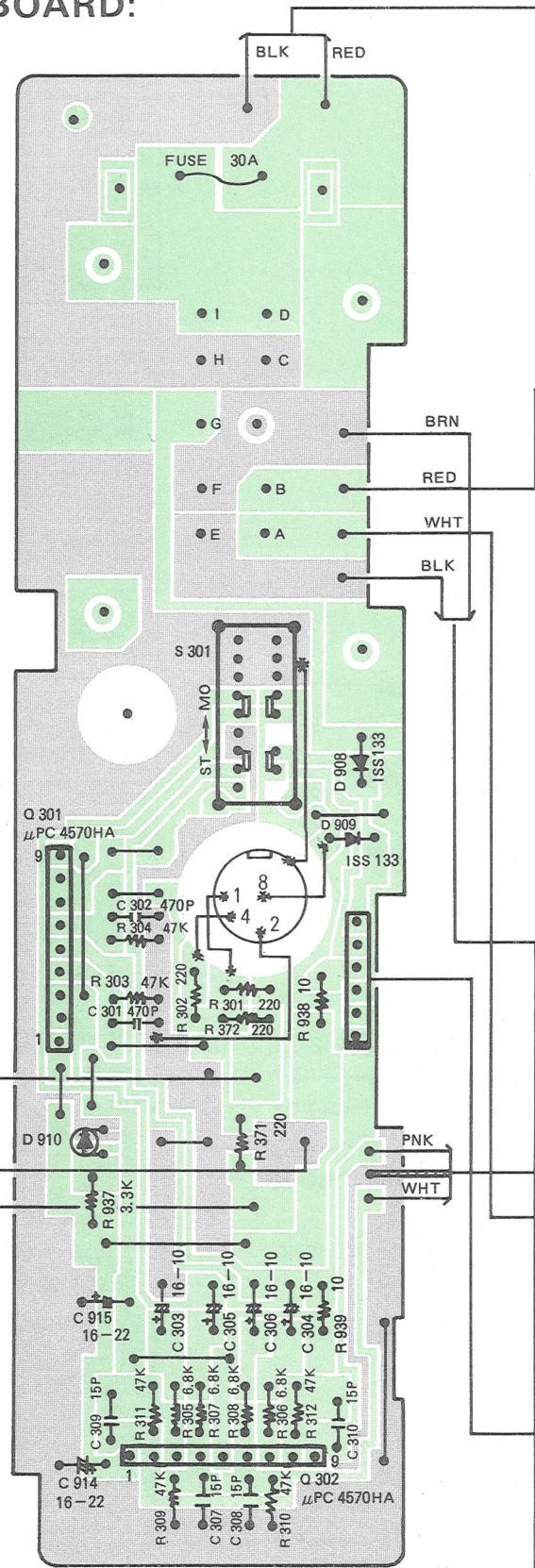
A	LEFT SPEAKER ⊕
B	RIGHT SPEAKER ⊕
C	GND
D	ACC
E	LEFT SPEAKER ⊖
F	RIGHT SPEAKER ⊖
G	AMP CONTROL +B
H	GND
I	ACC



1	L ch INPUT
2	SIGNAL GND
3	
4	R ch INPUT
5	
6	
7	
8	REMOTE POWER ON-OFF VOLTAGES



INPUT
L (WHT)
R (RED)

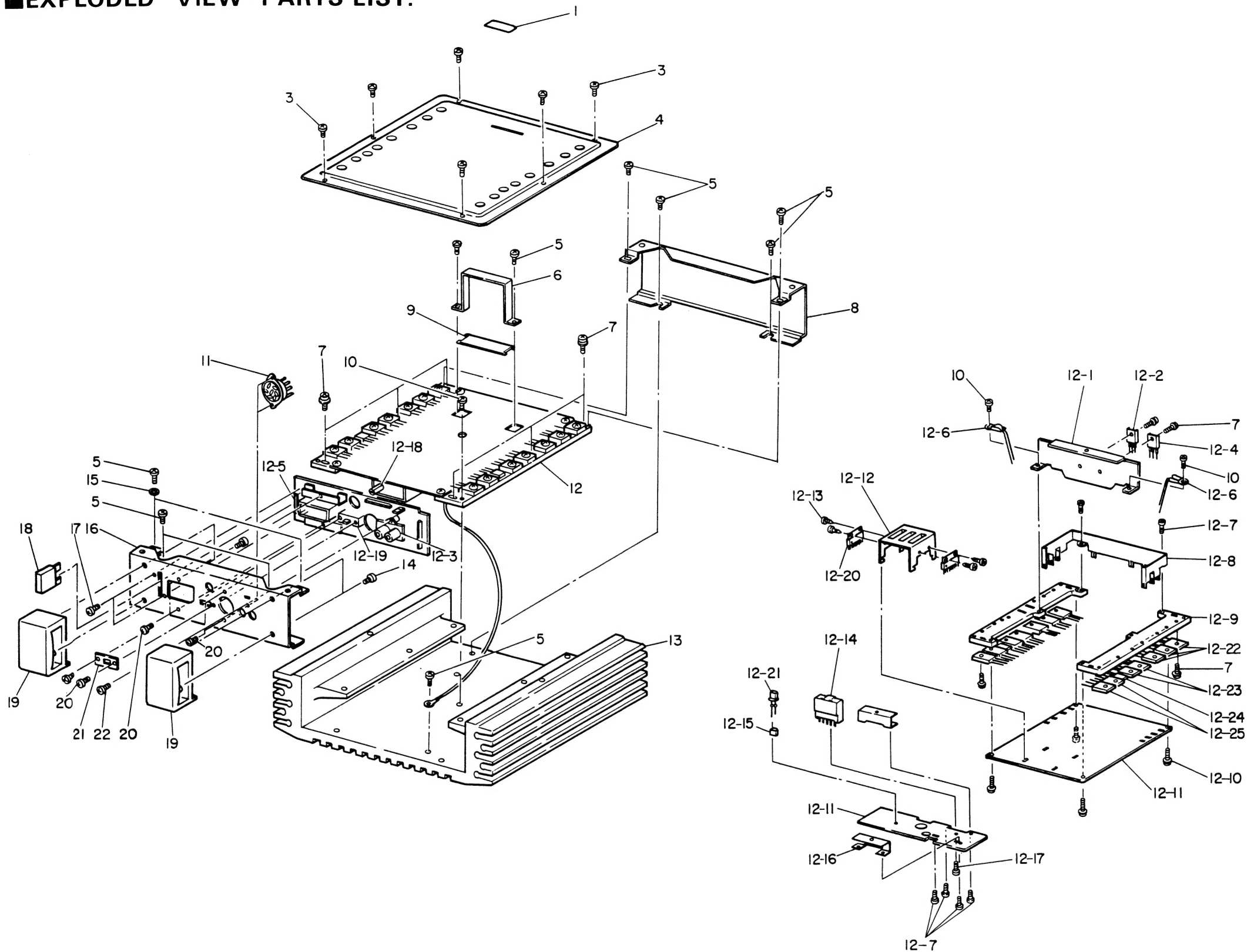


ADJUSTMENTS:

- POWER SUPPLY VOLTAGE :
Adjust R935 so that the voltage of TP103 is $-31V \pm 0.1V$.
- IDLING CURRENT
Before making adjustments, preheat under the following conditions :
Time : 15 minutes
Voltage : 14.4V
Input signal : No signal (Input shorted)
Output load : None

Adjust R329 (L) so that the voltage of TP101 is $4.4mV \pm 0.5mV$.
Adjust R330 (R) so that the voltage of TP102 is $4.4mV \pm 0.5mV$.

■EXPLODED VIEW · PARTS LIST:



REF. NO.	PART NO.	DESCRIPTION	QTY
1	286-6968-00	Set plate	1
3	653-0086-03	B-tight $\phi 3 \times 6$ (BLK)	6
4	653-0086-04	Lower case	1
5	653-0086-05	B-tight $\phi 3 \times 6$	11
6	653-0086-06	MTG BRACKET (TRANS)	1
7	653-0086-07	Double sems M 3×12	24
8	653-0086-08	Face panel	1
9	653-0086-09	Insulator plate	1
10	653-0086-10	B-tight $\phi 3 \times 8$	3
11	653-0088-01	DIN SOCKET	1
12	-	AMP ASSY	1
12-1	653-0086-22	Heat sink	1

REF. NO.	PART NO.	DESCRIPTION	QTY
12-2	653-0086-23	Diode (FMG 32S)	1
12-3	653-0086-24	Pin jack	1
12-4	653-0086-25	Diode (FMG 32R)	1
12-5	653-0086-26	AUTO FUSE holder	1
12-6	653-0086-27	Posister	2
12-7	653-0086-28	B-tight $\phi 3 \times 6$	6
12-8	653-0086-29	Earth bar	1
12-9	653-0086-30	Heat sink	2
12-10	653-0086-31	B-tight $\phi 3 \times 8$	4
12-11	653-0086-32	PCB	1
12-12	653-0086-33	Heat sink	1
12-13	653-0086-34	Screw M 3×6	4

REF. NO.	PART NO.	DESCRIPTION	Q'TY
12-14	653-0086-35	Connector	1
12-15	653-0086-36	LED holder	1
12-16	653-0086-37	Connector bracket	2
12-17	653-0086-38	P-tight $\phi 3 \times 8$	1
12-18	653-0086-62	Variable resistor	1
12-19	653-0086-67	Slide switch	1
12-20	653-0086-50	IC (μ PC 1225H)	2
12-21	653-0086-59	LED	1
12-22	653-0086-54	Transistor (2SD 1705)	6
12-23	653-0086-52	Transistor (2SD 1715)	4
12-24	102-3419-25	Transistor (2SC 3419Y)	2
12-25	653-0086-53	Transistor (2SB 1160)	4

REF. NO.	PART NO.	DESCRIPTION	Q'TY
13	653-0086-13	Heat sink	1
14	653-0086-14	Screw M 4 × 6 (BLK)	4
15	653-0086-15	WASHER $\phi 3$	2
16	653-0088-02	Escutcheon	1
17	653-0086-17	P-tight $\phi 2 \times 6$ (BLK)	2
18	060-0057-10	Auto fuse (30A)	1
19	653-0086-18	Handle	2
20	653-0086-19	Screw M 2.6 × 5 (BLK)	6
21	653-0086-20	Lock plate	1
22	653-0086-21	P-tight $\phi 3 \times 8$ (BLK)	1

■ PARTS LIST: © Electrical Section

REF. NO.	PART NO.	DESCRIPTION	QTY
Q 301, 302	653-0086-58	IC (μPC 4570HA)	2
Q 303, 304	653-0086-50	IC (μPC 1225H)	2
Q 305, 306	102-3419-25	Transistor (2SC 3419Y)	2
Q 307, 308	653-0086-51	IC (NJM 4558SD)	2
Q 309, 310, 313, 314	653-0086-52	Transistor (2SD 1715Q, S)	4
Q 311, 312, 315, 316	653-0086-53	Transistor (2SB 1160Q)	4
Q 401, 402, 403, 404, 910, 912	102-1815-51	Transistor (2SC 1815GR)	6
Q 405, 911	100-1015-25	Transistor (2SA 1015Y)	2
Q 406	051-0247-00	IC (TA 7317P)	1
Q 901, 902	102-2655-25	Transistor (2SC 2655Y)	2
Q 903, 904, 905, 906, 907, 908	653-0086-54	Transistor (2SD 1705Q, P)	6
Q 909	653-0086-55	Transistor (2SB 1009R)	1
Q 913	051-0749-00	IC (NJM 3524D)	1
Q 914	653-0086-57	IC (NJM 4558DX)	1
Q 915	653-0086-68	IC (78L 15)	1
Q 916	653-0086-69	IC (79L 15)	1
D 301~304, 401~403, 902, 903, 908, 909	001-0294-00	Diode (1SS 133)	11
D 901	001-0100-00	Diode (U05B)	1
D 904	653-0086-23	Diode (FMG-32S)	1
D 905	653-0086-25	Diode (FMG-32R)	1
D 906, 907	001-0323-58	Diode (RD 15EB 3)	1
D 910	653-0086-59	LED (SLP-155B)	1
L 301, 302	653-0086-60	Coil	2
L 901	653-0086-61	DC-DC coil	1
C 311, 312	174-4700-46	Ceramic capacitor (47pF SL)	2
C 313, 314, 902	179-4753-62	Electrolytic capacitor (50V 4.7 μF)	3
C 315, 316	173-3331-10	Polyester capacitor (50V 0.033 μF)	2
C 317, 318	173-4731-10	Polyester capacitor (50V0.047 μF)	2
C 906, 918	173-1031-10	Polyester capacitor (50V0.01 μF)	2
C 401, 402, 407	179-1063-32	Electrolytic capacitor (16V 10 μF)	3
C 403, 404, 903, 907	179-4763-22	Electrolytic capacitor (10V 47 μF)	4
C 408	179-4743-62	Electrolytic capacitor (50V 0.47 μF)	1
C 904	179-1073-32	Electrolytic capacitor (16V 100 μF)	1
C 905	179-1053-62	Electrolytic capacitor (50V 1 μF)	1
C 910, 911	179-4763-52	Electrolytic capacitor (35V 47 μF)	2
C 912, 913	179-3363-32	Electrolytic capacitor (16V 33 μF)	2
C 916, 917	179-1083-33	Electrolytic capacitor (16V 1000 μF)	2
C 307~310	174-1500-46	Ceramic capacitor (15pF SL)	4
C 405	160-1035-06	Ceramic capacitor (0.01 μF)	1
C 406	160-2235-06	Ceramic capacitor (0.022 μF)	1
C 301, 302	160-4712-05	Ceramic capacitor (470pF)	2
C 914, 915	182-2263-32	Electrolytic capacitor (16V 22 μF)	2
C 303~306	182-1063-32	Electrolytic capacitor (16V 10 μF)	4
C 901	653-0086-70	Electrolytic capacitor (16V 3300 μF)	1
C 908, 909	653-0086-71	Electrolytic capacitor (35V 3300 μF)	2
R 423, 424	653-0086-27	Posister	2
RL 401, 402	653-0086-66	Relay	2
R 315	653-0086-62	Variable resistor	1
R 329, 330	653-0086-63	Variable resistor	2
R 935	653-0086-65	Variable resistor	1
R 349, 351, 363, 364	653-0086-64	Cement resistor (5W 0.22 × 2)	4
R 365, 366, 369, 370	114-1001-21	Metalize resistor (2W 10Ω)	4